

ASSESSING the ADOPTION of PRACTICES INTRODUCED to MAIZE FARMERS by GOMBE STATE AGRICULTURAL DEVELOPMENT PROGRAMMES in SHONGOM LOCAL GOVERNMENT AREA of GOMBE STATE, NIGERIA

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Abstract:

This study assessed the adoption of practices introduced to maize farmers by Gombe State Agricultural Development Programmes (ADPs) in Shongom Local Government Area of Gombe State. The study specifically identified the practices introduced by ADPs extension agents to maize farmers in Shongom LGA, examined the adoption rates of the practices introduced to the farmers and analyzed the impact of the practices introduced on income of maize farmers. Data were collected through structured questionnaire and focus group discussion and analyzed using descriptive and inferential statistics. The findings revealed that 46.31% (157) of the respondents in the study were never been visited by ADPs extension agents while 53.69% (182) of the respondents were visited by the extension agents of the ADPs. Majority (87.37%) of the farmers were introduced to the improved seed variety of maize, 68.68% of respondents were introduced to practice of improved maize storage system, 63.19% of the respondents were introduced to using herbicides to control weed and 72.53% of respondents were introduced to mechanized farming in the study area. About 87.40% adopted the use of improved seed variety, 27.37% adopted the improved storage system of maize, 47.80% adopted the use of herbicides for control of weeds and 33.52% of the respondents adopted the practice of mechanized farming. In measuring the impact of the adopted practices on income, the chow-test statistics which was used revealed the value of the F-calculated (10.50) to be greater than the F-critical value (3.84). The practices introduced by ADPs had impact on the income of respondents. It is therefore recommended that ADPs and other research institutes should introduce more modern agricultural practices to the farmers, such practices should go beyond maize to cover other crops.

Keywords — Adoption, Maize, Farmers, Practices, ADPs

I. INTRODUCTION

Agriculture is important to the Nigerian economy as it engages about 70% of the labour force and contributes 32% of Gross Domestic Product (GDP); small farms produce 80% of the total crops [1]. However, the sector is faced with a lot of problems which makes it difficult to optimize its potentials. Over the years, several agricultural programmes have been introduced to reduce abject poverty among rural dwellers, mostly farmers, in sub-Saharan Africa (SSA). Some of these programmes include: United Nations Development Programme (UNDP), International Fund for Agricultural Development (IFAD), Agricultural Development Programmes (ADP), Food and Agricultural Organisation (FAO), and National Economic Empowerment and Development (NEED), The Directorate of Food, Roads and Rural Infrastructure (DIFRRI), National Orientation Agency (NOA), National Accelerated Food Production Programme (NAFP), Green Revolution (GR), Operation Feed the Nation (OFN) [2]. However, this study limits its scope to Agricultural Development Programmes (ADPs). ADPs have over the years helped in increasing food production for rural dwellers and raising the income level of small scale farmers by making provision for improved seeds, fertilizer, pesticides, credit facilities and infra- structural facilities [3].

Extension is an informal educational process directed toward the rural population. Extension is essentially the means by which new knowledge and ideas are introduced into rural areas in order to bring about change and improve the lives of individuals and their families. Extension, therefore, is of critical importance [4]. Agricultural Extension is the application of scientific research, knowledge, and technologies to improve agricultural practices through farmer education [5].

Without agricultural extension, farmers would lack access to the support and services required to improve their agriculture and other productive activities. The critical importance of extension can be understood better if its three main elements are considered: knowledge, communication and farm family. Agricultural extension aims to increase the efficiency of the family farm, increase production and generally increase the standard of living of the farm family [4].

Feedbacks are usually taken by the extension agents from farmers to the research station. The extension agent operates from the back drop belief that increased agricultural productivity depends primarily upon acceptance of improved cultural and technological change at the rural farm level and that peasant farmers can achieve improved production only if they adopt recommended agricultural practices in place of traditional practices. Successful adoption of

improved agricultural practices is predicated upon rural farmers acquiring the required knowledge and understanding of these technologies [6]. This will improve productivity and raise the living standards of the farmers who are the beneficiaries of the agent the efficiency of technologies generated and disseminated however, depends on effective adoption of the technologies by the end-users [6].

Eremie (7) postulated that agricultural extension services have a lot to play in ensuring that Nigeria achieves its myriad development goals. It was these perceived important roles of agricultural extension that informed the establishment of the agricultural development program (ADPs), with the re-organization and strengthening of the extension agent of the ADPS. This has led to a change in the roles performed by the extension workers thereby resulting in some level of satisfaction among both extension workers and their clients [8].

It is also worthy to note that despite the tremendous achievements of the agricultural sector in Nigeria, the ADPs have been faced by a myriad of problems, especially with the terminal end of the counterpart funding by the World Bank. These problems range from the non-availability of facilities necessary for effective implementation and functioning of extension workers to poorly motivated staff resulting in low morals, low level of role perception and poor performance of extension workers [9]

It is upon this background; especially on the roles played by ADP in Nigeria that this research work assessed the adoption of practices introduced to maize farmers by Gombe State Agricultural Development Programme in Shongom Local Government Area of Gombe State, Nigeria. The study objectives were to: identify the practices introduced by ADPs extension agents to maize farmers in Shongom LGA; examine the adoption rates of the practices introduced to the farmers, and analyze the impact of the practices introduced on income of maize farmers. The research hypothesis is:

H_0^1 : The practices introduced by ADPs have no significant impact on income of maize farmers in the study area.

H_A^1 : The practices introduced by ADPs have significant impact on income of maize farmers in the study area.

II. METHODOLOGY

A. The Study Area

The study was conducted in Shongom LGA of Gombe State. Gombe State is located in the northeastern part of Nigeria. The state covers an area of 20,265 km² and from the 2006 census has a population of about 2,365,000 people [10]. At 3.2% growth rate, the year 2020 projected population of the state is 3,585,104. Shongom LGA has its headquarters in the town of Boh in the north of the

Area. The town of Shongom lies between Latitude 9° 40' 25"N and Longitude 11° 15' 24"E. The LGA covers an area of 922 km² and has a population of 151,520 [10].

At 3.2% growth rate, the year 2020 projected population of the LGA is 229,689. Shongom has an annual rainfall of 560 - 740 mm (July - October) and lies 300 - 400m above sea level [11]. The area is bounded to the north by Akko LGA and to the west by Kaltungo LGA, the south is bound by Billiri LGA while, Karin-Lamido and Alkaleri LGA in both Taraba and Bauchi state forms the eastern boundaries of the local government area [12]. The area falls within the Sudan Guinea savannah, at the boundaries of the Sahel savannah belt; that separate the forest zone from the savannah areas. It has sparse vegetation and enjoys hot weather climate most part of the year [13]. The major spoken language is Tangale, other languages spoken are English and Hausa. Majority of the residents are mainly farmers, but during the dry season they involve in other activities as carpentry, welding, blacksmith etc. A total of seven villages in the LGA including Boh, Lapan, Lalaipido, Filiya, kulishen, Gwandom were selected for the purpose of this research.

B. Sample Size and Sampling Technique

Multi-stage sampling technique was employed in selecting the farmers for this study. In the first stage, out of all the Northeast States in Nigeria, Gombe was purposively selected because it was the first State in Northeast to witness the pilot trial of Agricultural Development Programmes (ADPs) in Nigeria. In the second stage, out of the 11 Local Government Areas(LGAs) in the State, Shongom LGA was purposively selected. The Local Government Area was selected because it has a high proportion of maize growers. In the third stage, a total of seven villages were purposively selected; these villages were selected based on the fact that high proportions of maize growers are found in them. In the fourth stage, simple random sampling technique was employed in selecting farmers from these villages to avoid being bias. Out of a sample frame of 2200 maize growers, 339 respondents were randomly selected as the sample size. See Table 1

Yamane (14) formula was used to calculate the sample size with 95% confidence level and 5% sampling error assumption.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n= Sample size (Total sample size)

N= Population size (Total sample frame)

e= Level of significance (set at 0.05 for this study)

To determine further the proportion of the respondents (sample size per village), Yamane [14] sampling method for determining of respondents was used, ie

Sample size of village =

$$\frac{S. \text{ frame of village} \times \text{Total s. size of all villages}}{\text{Total sample frame of all villages}}$$

Total sample frame of all villages

TABLE 1: POPULATION AND SAMPLE SIZE OF MAIZE FARMERS

State	LGA's	Villages	**Sampl e frame	Sampl e size
Gomb e	Shongo m	Lapan	400	62
		Boh	400	62
		Lalaipido	350	54
		Filiya	300	46
		Kushi	200	31
		Kulishin	300	46
		Gwandu m	250	38
Total		7	2200	339

**Source: Gombe State Agricultural Development Programme

C. Data Type and Source

Primary data and secondary sources of information were used for this work. Primary data was achieved via structured questionnaires and focus group discussion while the internet, journals, textbooks, conference papers etc were used as secondary sources of information.

D. Tool of Analysis

In this study, the descriptive and inferential statistics was used to achieve the specific objectives.

The descriptive statistics such as frequency count, table, percentage, range and mean are some of the mathematical tools were used and the Chow-test statistics was used to analyze the impact of the practices introduced by ADPs extension agents on income of maize farmers.

The empirical model is specified as follows:

$$F = \frac{(RSSR - SSR1 - SSR2)/k}{(SSR1 + SSR2)/n - 2k}$$

Where;

F= F-statistic

RSSR = the sum of squared residuals from a linear regression in which income of maize farmers before and after contact with ADP are assumed to be the same, the income has dimension k, and there are n observations in total.

SSR₁= the sum of squared residuals from a linear regression of income of sample 1

SSR₂= the sum of squared residuals from a linear regression of income of sample 2.

The total number of observation is $n = n_1 + n_2$ and the number of parameters is k.

III. RESULTS

E. Practices Introduced by ADPs Extension Agents to Maize Farmers in Shongom LGA.

Table 2 shows that 46.31% (157) of the respondents in the study area have never been visited by ADP

extension agents while 53.69% (182) of the respondents have been visited by the extension agents of the ADPs. The study henceforth focused on the 182 respondents who were visited by ADPs extension agents. About 12.60% (23) of respondents who were visited by extension agents indicated that they were not introduced to improved seed variety of maize while 87.37% (159) of the farmers claimed they were introduced to the improved seed variety of maize. This indicates that majority of the respondents were aware of the new technology. Also, the result further shows that 31.32% (57) of respondents were not introduced to the practice of improved storage of maize while 68.68% (125) of the respondents indicated that the practice was introduced to them. About 36.80% (67) of the respondents were not introduced to the use of herbicides while 63.19% (115) of the respondents indicated they were introduced to using herbicides in the control of weed. Furthermore, the result obtained shows that 72.53% (132) of respondents in the study area were introduced to mechanized farming while 27.47% (50) of the respondents were not.

F. Adoption Rates of Practices Introduced

Table 3 shows that 12.09% of the respondents did not adopt the practices introduced to them by the extension agents while 87.91% of the respondents adopted the practices. The table further revealed that 87.36% of the respondents adopted the use of

improved seed variety, 27.37% of the respondents adopted the practice of improved storage of maize, 47.80% adopted the use of herbicides for control of weeds and 33.52% of the respondents adopted mechanized farming. Use of improved maize variety was adopted by majority of the respondents and this finding is corroborated by the study of Mbugua [15] on Analysis of Factors Influencing Adoption of the Recommended Maize Technology's Package in Makuyu Division, Murang'a South District, Kenya, which revealed that all the maize farmers in the study area adopted improved maize varieties. The work of Issa *et al.* [16] on Analysis of Socio-economic Factors Influencing Farmers' Adoption of Improved Maize Production Practices in Ikara Local Government Area of Kaduna State, Nigeria which shows that only 41.60% of the farmers adopted improved maize variety contradicts the finding of this study.

G. Impact of ADPs Extension Services on Income of Farmers

Table 4 shows the annual mean income of farmer who adopted the practices introduced to them by ADP extension agents; the annual mean income of the respondent before contact with extension agents was lower than their annual mean income after they had contact with ADPs extension agents. It will be too early to conclude that the practices

introduced by ADPs extension agents had an impact on the income of the respondents by mere descriptive statistics. To measure the impact of the practices on income, the chow-test statistics was used. Table 4 further revealed that the value of the F-calculated(10.50) was greater than the F-critical(tabulated) value (3.84). This implies that the practices had impact on the income of respondents, hence, the null hypothesis rejected. This finding agrees with Madu and Wakili [17] who revealed in their study that there was substantial and positive impact of the ADPs on the income of farmers.

H. Testing of Hypothesis

The hypothesis 1 of the study which assumes that the practices introduced by ADPs extension agents have no significant impact on income of maize farmers in the study area was tested and the result in Table 5 shows that the value of F-calculated (10.50) was greater than F-critical value (3.84). This implies that the practices introduced by the ADPs extension agents had an impact on the respondents' incomes. The null hypothesis is therefore rejected and the alternative hypothesis accepted.

IV. CONCLUSION AND RECOMMENDATION

The major practices introduced to the farmers in the study area were improved seed variety of maize, improved storage of maize, use of herbicides and

mechanized farming. Improved maize seed had the highest adoption rate. The annual mean income of the farmers increased by 22.4%, which implies that the adoption of more practices introduced to farmers could positively transform their livelihoods. The annual mean income of the respondents increased by 22.4%. It is therefore recommended that ADPs and other research institutes should introduce more modern agricultural practices to the farmers, such practices should go beyond maize to cover other major crops.

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TABLE 2: PRACTICES INTRODUCED TO MAIZE FARMERS (N=182)

Variables	Freq.	Percent	Cum.
ADP visit			
Farmers not visited	157	46.31	46.31
Farmers visited	182	53.69	100.00
Improved seed variety			
No	23	12.64	12.64
Yes	159	87.36	100.00
Improved storage of maize			
No	57	31.32	31.32
Yes	125	68.68	100.00
Use of herbicides			
No	67	36.81	36.81
Yes	115	63.19	100.00
Mechanization of farming			
No	50	27.47	27.47
Yes	132	72.53	100.00

Source: Field Survey, 2020

TABLE 3: GENERAL ADOPTION OF PRACTICES INTRODUCED (N=182)

Adoption of service	Frequency	Percent	Cum.
Did not adopt	22	12.09	12.09
Adopted	160	87.91	100.00
Services adopted			
	Frequency	Percentage of Responses	Percent of Cases
Improved seed variety	159	44.54	87.36
Improved storage of maize	50	14.01	27.47
Use of herbicides	87	24.37	47.80
Mechanization of farming	61	17.09	33.52
Total	357*	100.000	196.15

Source: Field Survey, 2020

*Multiple Responses

TABLE 4: CALCULATED ANNUAL MEAN INCOME AND CHOW-TEST OUTCOME (N=182)

Year	Calculated mean annual income of the respondents (N)			
Before Contact with ADP	316,522			
2020	387,571			
RSSR	SSR1	SSR2	F-Calculated	F-Tabulated(f-critical) at 1% significance level
375.96	185.59	159.95	10.50	3.84

Source: Field Survey, 2020

TABLE 5: ANALYSIS OF STUDY HYPOTHESIS

Hypothesis	F-Calculated	F-Tabulated (f-critical) at 1% significance level
Hypothesis 1	10.50	3.84

Source: Field Survey, 2020